(19) World Intellectual Property Organization

· International Bureau



T DERIK ENIKOTEK IN DIRING KININ ERIKI ERIKI ERIKI ERIKI ERIKI ERIKE KININ KININ KININ KININ BIRINGA KININ DIR

(43) International Publication Date 29 April 2004 (29.04.2004)

PCT

(10) International Publication Number WO 2004/035798 A2

(51) International Patent Classification7:

C12N 15/82

(21) International Application Number:

PCT/EP2003/011658

(22) International Filing Date: 20 October 2003 (20.10.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

02079408.7

18 October 2002 (18.10.2002) EP

(71) Applicant (for all designated States except US): CROPDESIGN N.V. [BE/BE]; Technologiepark 3, B-9052 Zwijnaarde (BE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): INZE, Dirk [BE/BE]; Driesstraat 18, B-9310 Moorsel-Aalst (BE). DE VEYLDER, Lieven [BE/BE]; Josef Boddaertdreef 23, B-9031 Drongen (BE). VLIEGHE, Kobe [BE/BE]; Ter Weibroek 51, B-9880 Aalter (BE).

- (74) Common Representative: CROPDESIGN N.V.; Technologiepark 3, B-9052 Zwijnaarde (BE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: IDENTIFICATION OF NOVEL E2F TARGET GENES AND USE THEREOF

(57) Abstract: The present invention concerns a method for altering characteristics of a plant. The invention describes the identification of genes that are upregulated or downregulated in transgenic plants overexpressing E2Fa/DPa and the use of such sequences to alter plant characteristics. A preferred way for altering characteristics of a plant comprises modifying expression of one or more nucleic acid sequences and or modifying level and/or activity of one or more proteins, which nucleic acids and/or proteins are essentially similar to any one or more of SEQ ID NO 1 to 2755. Some of the genes identified in the present invention have an E2Fa target consensus sequence in their 5' upstream region. The identified genes play a role in a variety of biological processes, such as DNA replication, cell wall biosynthesis, nitrogen and/or carbon metabolism, transcription factors etc.



5

International Application No PCT/EP 03/11658

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/82 C07K14/415

A61K38/16

A01H1/04

A01H5/00

A61K31/713

According to International Patent Classification (IPC) or to both national classification and IPC

 $\begin{array}{ll} \mbox{Minimum documentation searched (classification system followed by classification symbols)} \\ \mbox{IPC 7} & \mbox{C12N} & \mbox{C07K} & \mbox{A01H} \\ \end{array}$

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, Sequence Search

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Х	EP 1 033 405 A (CERES INC) 6 September 2000 (2000-09-06) page 341, line 11 - line 13; sequences 72617,72618 claims 1-34	1-16,30, 32,36,37
L _.	DATABASE EMBL [Online] 18 October 2000 (2000-10-18), ALEXANDROV N. ET AL.: "Arabidopsis thaliana DNA fragment SEQ ID NO:72617" XP002283128 Database accession no. AAC52840 L: document disclosing SEQ ID NO:72617 of patent EP 1 033 405 the whole document	1-16,30, 32,36,37

Further documents are listed in the continuation of box C.	X Patent family members are listed in annex.
"Special categories of cited documents: "A" document delining the general state of the last which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date out later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "8." document member of the same patent family
7 June 2004	Date of mailing of the international search report 0 1 09 2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016	Authorized officer Blanco Urgoiti, B

Form PCT/ISA/210 (second sheel) (January 2004)



International Application No PCT/EP 03/11658

Category °	ation) DOCUMENTS CONSIDERED TO BE RELEVANT Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
L	DATABASE EMBL [Online] ALEXANDROV N. ET AL.: "Arabidopsis thaliana protein fragment SEQ ID NO:72618" XP002283129 Database accession no. AAG56488	1-16,30, 32,36,37	
	L: document disclosing SEQ ID NO:72618 of patent EP 1 033 405 the whole document		
x	DATABASE EMBL [Online] XP002283411 Database accession no. AC079733 nts 53131-54759 protein-id:AAG50748.1 page 8	5-11,16, 30,32, 36-39	
x	VEYLDER DE L ET AL: "Control of proliferation, endoreduplication and differentiation by the Arabidopsis E2Fa-DPa transcription factor" EMBO JOURNAL, OXFORD UNIVERSITY PRESS, SURREY, GB, vol. 21, no. 6, 15 March 2002 (2002-03-15), pages 1360-1368, XP002227182 ISSN: 0261-4189 cited in the application the whole document	1-4, 12-16,25	
A	VANDEPOELE K ET AL: "Genome-wide analysis of core cell cycle genes in Arabidopsis" PLANT CELL, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, ROCKVILLE, MD, US, vol. 14, no. 4, April 2002 (2002-04), pages 903-916, XP002259203 ISSN: 1040-4651 cited in the application		

INTENIATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/11658 😩

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1033405 A	06-09-2000	CA 2300692 A1 EP 1033405 A2	25-08-2000 06-09-2000